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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,342	10/28/2005	Hans-Jurgen Tolle	32860-000862/US	4634
30596 7590 06/04/2008 HARNESS, DICKEY & PIERCE, P.L.C. P.O.BOX 8910 RESTON, VA 20195				
EXAMINER				
DESAL, NAISHADH N				
ART UNIT		PAPER NUMBER		
2834				
MAIL DATE		DELIVERY MODE		
06/04/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/528,342

**Applicant(s)**

TOLLE ET AL.

**Examiner**

NAISHADH N. DESAI

**Art Unit**

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03/18/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03/18/2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SG/IC)
- Paper No(s)/Mail Date 03/18/2005 and 12/28/2007

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on 12/26/2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "coolant flowing through a stator cooling ring of the electric submarine drive motor" in claim 1 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Heine et al (NPL "Four-Circuit Dc Motor For Submarine Propulsion" Siemens Power Engineering & Automation, Siemens Ag. Berlin, DE, vol. 7, no. 2, March 1985 (1985-03)).

3. As per independent claim 1:

A redundant cooling device for an electric submarine drive motor, comprising (Fig 9 and page 100 Col 3 ll 4-8):

a first cooling circuit and a second cooling circuit, adapted to transport thermal energy away from the electric submarine drive motor, wherein coolant of the first cooling circuit and coolant of the second cooling circuit are adapted to flow in counter current (Fig 9) through a stator cooling ring of the electric submarine drive motor, in a region of the electric submarine drive motor (Fig 9 and Fig 9,A below and page 100 Col 1 ll 1-7).



Claims 2,4,5,11,19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al as applied to claim 1 above, in view of Lehman (US 4313309).

6. As per dependent claim 2:

Figure 2 of Lehman shows a main (high stage pump) and a minor (low stage pump). It is well known to those skilled in the art for the low stage device to have considerably lower power than the high stage device. The Lehman only discloses a single circuit, but it is well known to those skilled in the art to duplicate the parts of the first circuit and arrange them in a second circuit.

Heine et al teaches the use of counter flowing cooling circuits. Heine et al do not explicitly show the pumps used for cooling. Lehman teaches the use of high and low stage compressors to be used in cooling circuits. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al to show both main and minor pumps in the cooling circuits. The motivation to do so would be that it would allow one to significantly reduce electrical power consumption (Col 1 ll 33-39,48-49 of Lehman).

7. As per dependent claims 4 and 5:

Figure 2 of Lehman clearly shows that the low stage and high stage compressors can be operated independently and that both stages have on-off operating modes (abstract of Lehman).

8. As per dependent claim 11:

Heine et al and Lehman discloses the device as in claim 2 above. Lehman also teaches the use of a power supply and switching unit or control unit to be assigned to the cooling circuits. In regards to claim 11, Heine et al and Lehman discloses the claimed invention except for the multiplicity of cooling branches. Nonetheless it would have been obvious to one having ordinary skills in the art at the time the invention was made to duplicate and add another cooling branch to the cooling circuits since it has been held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.

In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

9. As per dependent claim 19:

Heine et al discloses the device in claim 1 above. Heine et al do not disclose the use of temperature sensor in the cooling circuits. Lehman teaches the use of a temperature sensitive probe (Col 4, lines 19-20 and 24-32).

It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al to include the temperature sensor of Lehman. The motivation to do so would be that it would allow one to control the motors and compressors (Col 4 lines 25-32 of Lehman).

Claims 12-14,16, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al as applied to claim 1 above and Lehman (US 4313309) in view of McCabria (US 5196746).

10. As per dependent claim 12:

Heine et al and Lehman discloses the device as in claim 2 above. Heine et al and Lehman do not disclose the motors to be constant voltage and variable frequency motors. McCabria teaches the use of variable speed constant frequency type motors. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to incorporate the teachings of McCabria into the device of Heine et al and Lehman to make motors having a fixed supply voltage and frequency. The motivation to do so would be that it would eliminate the need to have separate supply voltage lines for the different motors.

11. As per dependent claim 13:

Fig 1 of McCabria shows the use of inverters (elements 54 and 290) in a cooling circuit to control the amount of cooling of the cooling fluid.

12. As per dependent claim 14:

Heine et al clearly discloses a three-phase motor (page 97 Col 2 ll 27-37 and page 98 Col 3 ll 4-11). Heine et al do not explicitly disclose the use of a squirrel cage motor. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to choose a three-phase motor of the squirrel cage type. The



motivation to do so would be that the squirrel cage motor would be less expensive and require less maintenance.

13. As per dependent claim 16:

McCabria discloses the use of both a primary and auxiliary reservoir (Col 3 lines 22-25).

14. As per dependent claim 22:

Heine et al and Lehman discloses the device as in claim 2 above. Heine et al and Lehman do not disclose a non-return or one-way valve. McCabria shows in Figure 1 the use of pressure sensitive one-way valves. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al and Lehman with the one-way valves of McCabria. The motivation to do so would be that it would prohibit leakage of fluid in the direction it came from and permit better control over direction of cooling fluid in the cooling circuits.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al as applied to claim 1 above and Lehman (US 4313309) in view of Twerdochlib (US 4766557).

15. As per dependent claim 20:

Heine et al and Lehman teaches the device of claim 11 above. Heine et al and Lehman do not show pressure independent flow governor. Twerdochlib teaches the use of a flow governor which is not dependent on pressure in Col 3 lines 4-5. It would have been

obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al and Lehman to have the pressure independent flow governor of Twerdochlib. The motivation to do so would be that it would allow for better control of the flow of fluid and pressure control in the cooling circuits.

Regarding the placement of parts, Heine et al and Lehman discloses the claimed invention except for explicitly showing that the flow governor is upstream of the stator, inverter module and power supply and switching unit. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the flow governor to be upstream of the stator, inverter module and power supply and switching unit, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70.

Claims 3,5,15,24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al and Lehman as applied to claim 1 above and further in view of Wiedemann (US 3089969).

16. As per dependent claim 3:

Figure 1 of Wiedemann shows two motors driving two separate pumps. It is well known to those skilled in the art for motors driving separate circuits to have independent supply voltages. Heine et al and Lehman teaches the device per claim 1 above. Heine et al and Lehman do not explicitly disclose the supply voltages to be independent for the cooling circuits' motors or pumps. Wiedemann shows two cooling circuits to have two separate motors.

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It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the circuits of Heine et al and Lehmann with the teachings of Wiedemann to show the motors having separate supply voltages. The motivation to do so is that it is well known to those skilled in the art to have independent supply voltages for independent circuits and to allow for continued operation of the device without any interruption.

17. As per dependent claim 5:

Lehman teaches the control unit to be able to run the cooling circuit on the high stage above the low speed range of the low stage.

It would have been obvious to one having ordinary skills in the art at the time the invention was made to make the high stage device run above the low speed range of the apparatus, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

18. As per dependent claim 24:

Lehman teaches the control unit to be able to run the cooling circuit on the low stage independently of the high stage.

19. As per dependent claim 25:

Lehman teaches the control unit to be able to run the cooling circuit on the high stage independently of the low stage.

20. As per dependent claim 15:

Heine et al and Lehman teaches the device of claim 2 above. Heine et al and Lehman do not show the motors to have independent supply voltages. Wiedemann in Figure 1 shows the two cooling circuits to have two separate motors (main and minor). It is well known to those skilled in the art to have independent power supplies for the two independent motors shown in Figure 1 of Wiedemann. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al and Lehman with the independent supply voltages of the motors in Figure 1 of Wiedemann. The motivation to do so would be that it would provide a more robust and reliable cooling circuit and allow for the device to run without interruption from the other motors.

Claims 6,8, 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al in view of Amaral et al (US 6901765).

21. As per dependent claim 6:

Figure 1 of Amaral et al clearly shows coupling valves that are arranged in transfer lines between the two cooling circuits. Heine et al teaches the device as in claim 1 above. Heine et al does not explicitly show the coupling valves. Amaral et al clearly shows the use of coupling valves in a redundant cooling circuit. It would have been obvious to a

person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al with the coupling valves of Amaral et al. The motivation to do so would be that it would provide better control of coolant flow in the circuits.

22. As per dependent claim 8:

Amaral et al discloses the claimed invention except for the parts to be arranged on the upper part of the cooling circuit. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the parts of the cooling circuit on the upper part of the drive motor, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70.

23. As per dependent claim 21:

Heine et al teaches the device as in claim 1 above. Heine et al does not explicitly show the temperature controlled three-way valve. Amaral et al clearly shows the three-way valve in the heat exchanging cooling circuit in Figure 1. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al to include the three-way valve of Amaral et al. The motivation to do so would be that it would allow one to connect, redirect and control more cooling paths.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al as applied to claim 1 above and Amaral et al (US 6901765) in view of Lehman (US 4313309).

24. As per dependent claim 7:

Heine et al and Amaral et al disclose the device as in claim 6 above and to vary the circulation of the cooling circuits. Heine et al and Amaral et al do not disclose the output power of the drive motor to be adaptable to the amount of removable heat. Lehman discloses that the operation of the low stage is always intermittent due to the changing temperature, which equates to amount of removable heat. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al and Amaral et al to have the output power of the motor being adaptable to the amount of removable heat. The motivation to do so would be that it would reduce the power consumption and minimize the duration which the motors need to be operated (Col 1 lines 32-39 of Lehman).

Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al as applied to claim 1 above in view of Rowe (US 6596175).

25. As per dependent claim 9:

Heine et al disclose the device as in claim 1 above. Heine et al do not disclose the cooling circuit to have an inverter circuit module. Figure 1 of Rowe shows the cooling circuit to have a rectifier element which is directly cooled by the cooling circuit. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al to modify the device of Heine et al to include the inverter circuit of Rowe. The motivation to do so would be that it would

prevent the rectifier or inverter unit from overheating and to operate it under a stable temperature for maximum efficiency.

26. As per dependent claim 17:

Heine et al disclose the device as in claim 1 above. Heine et al do not disclose the cooling circuit to have a degassing device or a service connection. Rowe teaches the use of both a degassing device and a service connection. Figure 1 of Rowe shows the reservoir tank to have a vent and element 40 to be a flow valve, which can be manually operated to allow a technician to periodically inject carbon dioxide to clear the strainer (Col 5 lines 1-6 of Rowe). It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al to include the degassing device and the service connection of Rowe. The motivation to do so would be that it protect the system from developing too much pressure and improve the lifespan of the system by allowing to manually service and monitor it under regular intervals.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al as applied to claim 1 above, in view of Twerdochlib (US 4766557).

27. As per dependent claim 18:

Heine et al disclose the device as in claim 1 above. Heine et al do not disclose the cooling circuit to have a pressure relief valve. Twerdochlib teaches the use of a pressure regulator in figure 1 and Col 3 lines 4-5. It would have been obvious to a

person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al to include the pressure regulator of Twerdochlib. The motivation to do so would be that it would allow one to maintain proper pressure range of the fluid (Col 3 lines 1-3 of Twerdochlib).

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al as applied to claim 1 above, in view of Mantovani (US 4916341).

28. As per dependent claim 23:

Heine et al disclose the device as in claim 1 above. Heine et al do not disclose the cooling circuit to have quick action couplings or connectors. Mantovani teaches the use of quick couplings to connect and disconnect rapidly and easily (Col 2 lines 1-2). The use of quick couplings are very well known to those skilled in the art. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the device of Heine et al to include the quick couplings devices of Mantovani. The motivation to do so would be that it would allow one to connect and disconnect the cooling lines as needed and that it would improve maintenance access to cooling lines.

### ***Conclusion***

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892 for details.

### ***Response to Arguments***

30. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection made in view of Heine et al.



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31. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it is well known to combine and incorporate teachings from different types of motors to suit the performance criteria as desired.

32. According to § 2111 of the MPEP, claims must be given their broadest reasonable interpretation. A portion of this section is cited below for the practitioner's convenience:

During patent examination, the pending claims must be "given \*>their< broadest reasonable interpretation consistent with the specification." >*In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000).< Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. See *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).

33. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NAISHADH N. DESAI whose telephone number is (571)270-3038. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571) 272-2044. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Patent Examiner

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